A Low Cost Solar Still for Pure Water Production.

ABSTRACT

This study involves the design and development of a triangular solar still (TSS) for providing pure water from saline and contaminated water. The TSS was fabricated with cheap, lightweight and locally acquired but durable materials for easy maintenance. The TSS consists of a trough made of Perspex, main frame, polythene cover and support structure. A few field experiments were carried out using seawater, pond water and synthesized salt water of varying salt percentages. The variations of temperatures, relative humidity and solar radiation were monitored along with the hourly water production. A new relationship was obtained between the temperature difference (cover-water) and daily production. The water quality analysis was performed before and after the experiments. The values of total dissolved solids were reduced to 1.2 from 57.7 ppm and to 440.4 from 9999 ppm. The electrical conductivities prior to the experiment were 114.5 and 17.1µS/cm which reduced to 104.41 and 2.52 µS/cm, respectively, after the experiment. The salinity values were reduced to 40 from 60 ppm and to 30 from 1003 ppm as well. These values fall within the accepted ranges for drinking water guidelines of the World Health Organization. Therefore, it is concluded that the TSS is able to provide pure water from saline and contaminated water for drinking purpose.

Keyword: Triangular solar still; Solar radiation; Production; Water quality; Distillate quality; Solar still